GREEN MATTERS

A newsletter from the Alberta Environmentally Sustainable Agriculture Council

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Greenhouse Gases - A Reasoned Response

From AESA Council's Chair

by Bruce Beattie, Alberta Milk Producers

This issue of *Green Matters* is intended to raise awareness and knowledge of a subject that has the potential to exert a significant impact on the entire agriculture and food processing industry. While controversy still surrounds the question of whether human activity is having a measurable impact on the earth's climate, society has determined that greenhouse gas emissions must be reduced. Power generation and transportation are recognized as major contributors to the problem, but agriculture is also considered an important component in meeting Canada's international commitment to reduce emissions.

Regardless of personal opinions as to the effect of human activity on our climate, or even the veracity of the science of global warming, our industry must be prepared to do its part. We need to be informed and involved. Our goal must be to strike a balance between a dogmatic "do-nothing" approach and the possibility of onerous controls and regulations that could severely affect the industry's sustainability.

In many cases, using practices that improve efficiencies and conserve natural resources will also reduce our industry's emissions. Our efforts toward sustainability should drive us as much as any greenhouse gas commitment.

The Government of Alberta has initiated Climate Change Central (CCC), a unique public/private sector agency with representation from all sectors of society. CCC was established in November 1999 to implement the recommendations of Alberta's Climate Change Round Table. I represented the Alberta Environmentally Sustainable Agriculture (AESA) Council on the steering committee responsible for developing CCC. CCC is expected to be the major player in developing and implementing Alberta's greenhouse gas strategy.

As part of its mandate, AESA is required "to encourage the industry to proactively address environmental issues." To help develop an industry-wide greenhouse gas strategy, AESA Council will jointly sponsor a Greenhouse Gas Forum on March 13 and 14, 2000. The AESA Program is also developing a set of factsheets, funding two research projects on greenhouse gas storage and emissions, and supporting extension projects on practices that help reduce emissions.

I am confident that our efforts will provide the basis for Albertans to develop a better understanding of how these gases are stored and released and their potential effect on the earth's climate. With that knowledge will come the ability to make a sound and reasoned response to the climate change issue.

WHAT'S INSIDE

Issue No. 3, Winter 2000

INDUSTRY RISKS & OPPORTUNITIES IN THE GREENHOUSE GAS ISSUE

Courtesy Alberta Agriculture, Food and Rural Development

The debate over climate change is a tangle of political, economic and scientific views. Nevertheless, Canada has committed to reduce the nation's greenhouse gas emissions under the international Kyoto Protocol (see "*Greenhouse Gas Basics*"). National and provincial processes to meet Canada's commitment have indicated that all greenhouse gas emitters – including the agriculture and food processing industry – will be expected to do their fair share in reducing emissions.

"It is apparent that the government intends to take some kind of action," says Peggy Strankman. She is the Canadian Cattlemen's Association (CCA) representative on the Agriculture and Agri-Food Table. This Table is one of 16 tables and groups in the national process, with responsibility to assess options to reduce emissions. "The CCA felt it was important to participate in the process to ensure that the views of cattle producers were heard and reflected in any policies that might arise from the process."

Involvement by the agriculture and food processing industry in the national and provincial processes is important for meeting the potential challenges this issue may present. Some of the possible risks and opportunities for the industry include:

- ***Risk – The industry could be expected to reduce emissions in ways that could limit its productivity.*** Without strong industry involvement, guidelines or regulations that are developed to meet Canada's commitment might not consider the industry's special needs. For example, while carbon dioxide is the main emission by most industries, the crop and livestock sectors' main emissions are nitrous oxide and methane – both much more potent than carbon dioxide in their greenhouse gas effect (see "*Greenhouse Gas Basics*"). So solutions for other industries are not the entire solution for agriculture.
- ***Opportunity - Practices that reduce emissions can help to conserve resources and improve efficiencies.*** Many cost-effective practices that conserve soil, water and energy also help reduce emissions (see "*You May Already Be Reducing Emissions*"). As well, carbon and nitrogen losses to the atmosphere represent lost nutrients and other inefficiencies. For instance, in the cattle industry, "Many of the actions that will decrease greenhouse gas emissions will also improve efficiencies," says Strankman. "These actions include manure management, increasing feed efficiencies and calving success, and improving grazing management."

> "Many of the actions that will decrease greenhouse gas emissions will also improve efficiencies."

- ***Risk – The industry's competitiveness could be affected.*** There is speculation that international trade sanctions and other limits to market access might be used to enforce compliance to Kyoto commitments. In addition, if the industry is required to use costly options to reduce emissions, then its products could have a cost disadvantage.
- ***Opportunity – Emissions reduction could enhance the industry's image.*** The majority of consumers in Canada and abroad feel that action has to be taken now on greenhouse gas emissions. By actively reducing emissions, the industry could demonstrate its stewardship ethic. This approach could improve its market opportunities among consumers concerned about the environment.

Agricultural practices affect emissions and storage of carbon and nitrogen.

- ***Risk – The science has uncertainties.*** In terms of the science of global warming, there are uncertainties around some factors (see "*Greenhouse Gas Basics*"). There are also issues around the science of measuring gas emissions and storage. For example, Strankman says, "Emissions from cattle are currently calculated as though the entire herd were mature cows. However, about half our herd are calves, and calves produce much less methane." She also notes, "Currently the Kyoto agreement doesn't recognize opportunities to store carbon in agricultural lands…If that recognition is not forthcoming, it will be very difficult for Canada to meet its emissions reduction targets." Without accurate information, it could be difficult to assess which options truly reduce emissions the most.
- ***Opportunity – The national process could result in research incentives.*** Influence from the industry could help to ensure that incentives are available for research to more accurately determine emissions and storage, and to develop practical options for the industry to practice good stewardship while making a living.
- ***Risk/Opportunity – Climate change could affect the industry.*** Some of the potential impacts for the prairies could include more frequent and severe droughts, and higher temperatures. Although higher temperatures might increase crop choices and yields, they could also increase numbers of certain insect pests and diseases.

For more information, call Karen Haugen-Kozyra of Alberta Agriculture, Food and Rural Development at 780-422-1791.

Carbon Credit Complexities

"Doing the prudent thing early is part of our philosophy," says Paul Vickers of TransAlta. He's giving one of the reasons why TransAlta, an Alberta-based electric energy company, has taken a variety of steps to manage its risks related to the greenhouse gas issue. Its strategies include improving its own energy efficiency and encouraging the development of renewable energy sources. But the strategy creating the most interest among farmers is the purchase of carbon dioxide emission reduction credits to offset TransAlta's emissions.

TransAlta is part of a group of 10 Canadian energy companies called the Greenhouse Emissions Management Consortium (GEMCo). In October 1999, GEMCo announced an agreement with IGF Insurance Company, a major United States crop insurer, to purchase carbon credits from U.S. farmers. Under this agreement, a farmer would sign a contract to adopt specified practices on specified fields, explains Vickers. The farmer has to be changing practices on those fields, so fields where conservation practices are already in use are not eligible.

Many conservation farming systems help to store carbon in the soil. However, agricultural soils are not currently recognized as a carbon sink under the Kyoto Protocol. Canada and the U.S. are working to change this, but European countries are opposed.

Courtesy Alberta Agriculture, Food and Rural Development

Direct seeding systems help to store carbon.

With no ground rules set, why is TransAlta willing to buy carbon credits? Vickers explains: "It's about risk, and managing risk is what companies do well – and what farmers do well....With some effort, you can figure out what the risks are likely to be and manage them."

TransAlta has been doing its homework to manage its risks related to carbon credits. For example, GEMCo is a partner in a world-leading study about the effects of various agricultural practices on soil carbon storage. GEMCo and IGF also have a system in place to monitor and verify that contractors are meeting their agreements.

In addition, a TransAlta representative is one of the co-chairs of the Credit for Early Action Table and is sitting on the Electricity Table, two of the tables in the national process to address the Kyoto Protocol. "We think there's a significant chance that government will set regulations requiring reductions in greenhouse gas emissions," says Vickers. "We believe the best way is to help the government shape the regulations in the most practical way for the [energy] industry."

Carbon credits could have some positives for the agriculture and food processing industry. For example, they might enhance incomes of conservation farmers or encourage greater adoption of conservation practices.

But the agriculture and food processing industry will need to do its homework too. "I think there are far more questions than answers on the whole issue of trading credits," says John Kolk who sits on AESA Council's Greenhouse Gas Task Team.

Some of the questions include:

- If agricultural soils are accepted as a sink, what international rules will govern the measurement of soil carbon and carbon credit trading?
- Who legally owns carbon credits?
- What are carbon credits truly worth? Will farmers need their credits to offset emissions from other parts of their operation? If grain farmers sell their credits to an energy company for a low price, would livestock operators need to buy back the credits at a much higher price? Do livestock operators buy the credits when they buy the grain to feed their cattle?
- Will farmers already using conservation practices be rewarded for these early efforts?

AESA's Greenhouse Gas Task Team recommends a cautious approach to carbon credit trading. The team would also like to see a balanced approach which considers the short- and long-term consequences for all sectors in the industry. Says Kolk, "The agriculture and food processing industry has many parts, each interdependent."

For more information, visit the Soil Conservation Council of Canada's discussion paper at http://cattlefeeder.ab.ca/manure/carbonsequest.shtml. Or attend the *Agriculture Industry Greenhouse Gas Forum* on March 13-14 in Nisku. AESA Council is sponsoring this forum to develop an industry-wide greenhouse gas strategy for Alberta. Call 780-422-1791 for details on the forum.

GREENHOUSE GAS BASICS

Courtesy Alberta Agriculture, Food and Rural Development

Here's a simplified introduction to some of the terms and concepts related to this issue.

The term ***greenhouse effect*** is used to describe the natural process of heat trapping in the earth's atmosphere by various gases called ***greenhouse gases***. The major greenhouse gases are water vapour, carbon dioxide (CO_2), methane (CH_4), halocarbons (CFCs, used as refrigerants) and nitrous oxide (N_2O).

Greenhouse gases come from natural and human ***sources***. The gases can be removed from the atmosphere by ***sinks***. Most human-induced emissions are in the form of carbon dioxide from burning fossil fuels for such things as transportation, manufacturing and heating.

Each gas has its own ***potency*** in terms of greenhouse warming potential. For example, methane is 21 times more potent than carbon dioxide, and nitrous oxide is 310 times more potent than carbon dioxide. Therefore, gas concentrations are often given in ***carbon dioxide equivalents***.

The greenhouse effect is an important natural process that keeps the planet warm enough to be hospitable to life as we know it. International concern has arisen because of solid scientific evidence of:

- ***changing concentrations of greenhouse gases*** in the atmosphere. Most greenhouse gas experts agree that the pattern of changes strongly indicates the influence of human activities.
- an ***unusually rapid increase in the earth's surface temperature***. The estimated change in the average temperature over the last century is 0.4 to 0.8°C. Although this sounds small, climatologists believe the difference between our present climate and the Ice Ages is only about 4°C. As well, the temperature has risen especially quickly over the past 20 years. Rapid global warming could cause such problems as more severe weather events like tornadoes, droughts and winter storms, increased forest fire risks, and damage to water resources.

Peter Dzikowski, Alberta Agriculture's representative on the national Agriculture and Agri-Food Table, explains that much of the scientific debate on this issue concerns "whether the evidence from measured global climate data now available is sufficient to **conclusively prove** that changes in the atmosphere's composition are already causing climate change."

The Intergovernmental Panel on Climate Change prepared two major reports (1990 and 1995), representing the input of over 2,000 scientific experts from more than 70 countries. These reports conclude that "the balance of evidence…suggests a discernible human influence on global climate." The world's developed nations, including Canada, have accepted this evidence and made commitments to reduce emissions. Under the international agreement known as the ***Kyoto Protocol***, Canada has committed to reduce the nation's greenhouse gas emissions to 6% below 1990 levels by 2008 to 2012.

A ***national process*** is assessing the impacts of the Protocol on Canada and developing options for implementation. There are 16 tables and groups in the national process; the ones of most importance to the agriculture and food processing industry are the Agriculture and Agri-Food Table and the Sinks Table. The Government of Alberta is very active in the national process and has also set up ***Climate Change Central*** to develop a "made in Alberta" strategy to ensure that Alberta's interests are addressed.

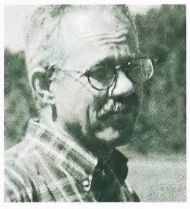
The Canadian agriculture and food processing industry contributes about 12% of the nation's greenhouse gas emissions. The ***agriculture sector's*** main emissions are methane from livestock and manure, and nitrous oxide from fertilizer. The ***food processing sector's*** main emission is carbon dioxide.

For more information, try starting at Environment Canada's Global Climate Change site (http://www.ec.gc.ca/climate/) or call Shane Chetner of Alberta Agriculture at 780-427-3615.

COUNCIL PROFILES

Andrew Hudson

Andrew Hudson's career focuses on the environment, but the root of his commitment is personal "When my five-year-old daughter is my age, I want her to be in a world that's still beautiful, productive and diverse... I want to be sure that my generation puts something back for the next generation so the world will still be a nice place for my daughter."



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Hudson recently replaced Donna Tingley on AESA Council as the representative for the Environmental Law Centre (ELC). This non-profit, charitable organization is staffed by lawyers and a librarian, and is overseen by a volunteer Board of Directors representing business and industry, the legal community, environmental organizations and academics.

Hudson has practiced law in Alberta for over 20 years. For most of that time, he was a partner with Emery Jamieson in Edmonton. His work with the ELC started nearly a decade ago. "In 1991, I was seconded to the ELC for four months to write a book about waste management law. Then I went back to my law firm. From 1993 to 1997, I served on the ELC's volunteer board while I was a partner in the firm. Then in June 1998 I became an employee of the centre."

> "I want to be sure my generation puts something back for the next."

As a Staff Counsel at the ELC, he fields questions and gives advice on environmental law to environmental groups, businesses and others. He's also involved in law reform to protect the environment, and it's in this capacity that he serves on the Livestock Regulations Stakeholder Advisory Group (LRSAG, see the Fall 1999 issue of *Green Matters*). He also does research, writes publications and gives seminars on environmental law. And he's the Editor-in-Chief of the Journal of Environmental Law and Practice, a scholarly Canadian law journal.

Along with serving on AESA Council and the LRSAG, Hudson is also on the Canadian Adaptation and Rural Development Fund Action Team under the Agriculture and Food Council. This team reviews project applications related to such topics as enhancing the industry's global competitiveness and environmental management.

Hudson believes AESA Council can play a vital role for all Albertans: "AESA Council has a part in preserving the land base of Alberta. Whether you're an environmentalist, a farmer or an ordinary Albertan, you would be so much the poorer if we were to lose this resource."

Bill Stewart

"We as farmers have to be green and environmentally friendly. And we have to get the word out that we are green," says Bill Stewart.

Stewart is the vice-chair of AESA Council and the chair of the North East Regional Committee of AESA's Farm Based Component. "The main benefit of the Farm Based Component," he says, "is the ongoing work of the agricultural service boards and farm organizations dealing with concerns that are directly relevant for local farmers. Issues like winter feeding sites and riparian management. Five or ten years ago, the average farmer never thought about such things."

AESA's other components also help make change happen, he notes. The Processing Based Component shows processors "that changes are possible to be environmentally friendly." And there's AESA's research support: "Issues like phosphorus in soils and greenhouse gases are going to have an impact on us. Research will help us to address these issues."

Stewart and his wife Linda have a mixed farm north of Vegreville. They grow cereals, oilseeds and pedigreed seed on about 1500 acres and have a cow-calf operation. They're also active in their community. After their two sons grew up, Linda became a teacher. And Stewart was a municipal councillor for about eight years.

Stewart's commitment to being green is clear. He uses direct seeding to conserve moisture and prevent erosion. To protect water quality, he's moved his cattle and watering areas up from the old location in a coulee. "With our neighbours, we planted a shelterbelt around a quarter section and we winter the cattle there." The shelterbelt shelters the cattle while conserving moisture and minimizing erosion.

Dean Jeffrey Photography

He has three quarter sections in a rotational grazing system and is adding more. With assistance from PFRA, he's added some dugouts to these pastures. "We'll be putting solar panels and a pump on a trailer so we can move the pumping system when we move the cattle." Pumping dugout water to the cattle helps keep the water clean and healthy.

Stewart is optimistic about a green future. "It's a slow process, but change is happening." And he's firm about the importance of a green future: "We not only need to conserve soil and water for the sake of our own operations, but also because the attention of the media and the public is on us."

You May Already Be Reducing Emissions

Shelterbelt plantings conserve soil and water, and also help to store carbon.

Courtesy Alberta Agriculture, Food and Rural Development

"Trends on the prairies over the past 20 years are positive in terms of carbon storage friendliness," says Tom Goddard, a soil conservation specialist with Alberta Agriculture. He's speaking about the growing adoption of practices that conserve soil, water, biodiversity and energy resources while reducing carbon dioxide emissions. Examples include field shelterbelts, rotational grazing and reduced tillage.

And with greater adoption of known practices, greenhouse gas emissions could be further reduced. "If we applied what we already know about managing nitrogen, we could make a large difference in nitrous oxide emissions," explains Elston Solberg, a fertility research agronomist with Alberta Agriculture. "For example, if we manage the timing, method, rate and source of nitrogen fertilizer applications and use soil tests – really simple stuff – we can reach 80% of our goal to reduce emissions. Then we can add some fancy stuff like split applications, polymer coatings and nitrification inhibitors to reach our goal."

Nitrous oxide is emitted from all nitrogen sources – manure, fertilizers, soil nitrogen (especially from summerfallow), legumes, compost and so on. "Soil testing gives a good read on all forms of nitrogen and other nutrients, especially when combined with crop histories," notes Solberg. "If you fine-tune your fertility program to match nutrient additions with removals…we'll get darn close to our goal for reducing nitrous oxide emissions."

Direct seeding (or zero tillage) is a good example of an existing practice with greenhouse gas benefits. Solberg says that the most convenient fertilizer application options for direct seeding systems, such as spring banding, also reduce nitrous oxide emissions. And direct seeding systems slow the release of carbon from soil. So farmers using direct seeding to conserve moisture, improve yield potential, reduce erosion and reduce fuel costs, are also reducing emissions.

Research will be needed to test and fine tune some practices and to prove to the international community that the practices do reduce net emissions. "To prove that we've been successful, we will need to be able to measure storage and emissions of greenhouse gases in a verifiable manner," explains Goddard. Goddard is Alberta Agriculture's representative on the Sinks Table, part of the Canadian process to address the Kyoto Protocol.

AESA is supporting several projects to address the greenhouse gas issue. The Processing Based Component is funding a new project by the Alberta Food Processors Association (AFPA) to compile and distribute information on energy-efficient practices. Some Farm Based Component projects have greenhouse gas spinoff benefits. And AESA is funding two research studies on the storage and emission of greenhouse gases from agricultural lands.

For more information on reducing emissions, call Elston Solberg at 780-422-1222 for production options, and Ken Gibson of AFPA at 780-444-2272, for processing options.

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Green Matters is the newsletter of the Alberta Environmentally Sustainable Agriculture (AESA) Council. Council consists of 29 representatives from Alberta's agriculture and food processing industry, environmental organizations and government. Its mandate is to: identify and evaluate environmental issues facing Alberta's agriculture and food processing industry; encourage the industry to proactively address these issues; advise the Alberta Minister of Agriculture, Food and Rural Development on these issues; and direct the AESA Program.

The purpose of *Green Matters* is to provide a forum for discussion of environmental issues in Alberta's agriculture and food processing industry.

To subscribe to *Green Matters*, call 780-422-4385.

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